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IN THE
# Supreme Court of the United States

EXCEL COMMUNICATIONS, INC.,
EXCEL COMMUNICATIONS MARKETING, INC.,
AND EXCEL TELECOMMUNICATIONS, INC.,
*Petitioners,*

v.

AT&T CORP.,
*Respondent.*

**Petition for a Writ of Certiorari to the United States Court of Appeals for the Federal Circuit**

## PETITION FOR A WRIT OF CERTIORARI

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## QUESTION PRESENTED

Whether—despite the long-established prohibition on patenting of laws of nature, natural phenomena, and abstract ideas, including mathematical formulas and algorithms—a method of manipulating data according to a mathematical operation constitutes a patentable process under 35 U.S.C. § 101 solely because the answer produced by the method has a useful application.

## PARTIES TO THE PROCEEDING AND RULE 29.6 STATEMENT

Petitioners Excel Communications, Inc., Excel Communications Marketing, Inc., and Excel Telecommunications, Inc., and respondent AT&T Corp. are the only parties to this proceeding.

Excel Communications, Inc., which wholly owns Excel Communications Marketing, Inc. and Excel Telecommunications, Inc., is wholly owned by Teleglobe, Inc. Teleglobe, Inc. has publicly held stock.

Bell Canada, a publicly held company, owns more than 10 percent of the stock of Teleglobe, Inc.

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**Petition for a Writ of Certiorari to the United States Court of Appeals for the Federal Circuit**

## PETITION FOR A WRIT OF CERTIORARI

The Federal Circuit has adopted a new standard that dramatically expands the scope of patentable subject matter (under 35 U.S.C. § 101) to cover pure processes of manipulating data according to mathematical formulas or algorithms. The new standard, which requires no more than some practical usefulness of the result of the mathematical manipulation, was suggested in *dicta* in *State Street Bank & Trust Co. v. Signature Financial Group, Inc.*, 149 F.3d 1368 (Fed. Cir. 1998), *cert. denied*, 119 S. Ct. 851 (1999). That case, however, actually involved a particular kind of machine, not a process (and respondent opposed certiorari for precisely that limiting reason). In the present case, the Federal Circuit squarely established this new standard as the governing law by announc-

ing that it applies (and by applying it) to pure method claims.

The Federal Circuit's new "usefulness" standard is a repudiation of the far more limiting "transformation or reduction" standard set forth in this Court's precedents, the most recent of which pre-dates the formation of the Federal Circuit in 1982. The Federal Circuit has all but expressly acknowledged that its new standard simply treats key precedents of this Court as effectively outmoded, and therefore no longer worthy of being followed. There can be no doubt, moreover, of the sharpness of the change in governing standards wrought by the Federal Circuit: in the year since *State Street*'s *dicta*, the U.S. Patent and Trademark Office (PTO) has seen a dramatic increase in applications for software patents.

The Federal Circuit's decision effects a conceded "sea-change" in the fundamental standards for patentability in a vital sector of the economy. Pet. App. 8a. Because it has an undisputed practical impact, defies this Court's precedents, and is unsupported by any new congressional direction to rewrite the governing principles, the new standard should not be allowed to take hold by the unreviewed action of the Federal Circuit. Accordingly, petitioners (collectively "Excel") respectfully petition this Court to review the judgment of the United States Court of Appeals for the Federal Circuit in this case.

## OPINIONS BELOW

The opinion of the court of appeals (Pet. App. 1a-19a) is reported at 172 F.3d 1352. The memorandum opinion, order, and final judgment of the district court (Pet. App. 20a-36a) are not reported.

## JURISDICTION

The judgment of the court of appeals was entered on April 14, 1999. The jurisdiction of this Court is invoked under 28 U.S.C. § 1254(1).



## STATUTORY PROVISIONS INVOLVED

35 U.S.C. § 100(b) provides:

> The term "process" means process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material.

35 U.S.C. § 101 provides:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

## STATEMENT OF THE CASE

### A. The Patent at Issue

AT&T's patent involves an elementary mathematical operation that is useful in (among other things) long-distance telephone programs like MCI's "Friends and Family" that charge less when the originating number and terminating number have their long distance calls carried by the same long-distance company. The "technological" background is simple. According to the '184 patent, when a long-distance telephone call is made from one telephone line (the originating number) to another (the terminating number), certain pieces of basic information are generated in the telecommunications network composed of switches and telephone lines. In addition to the originating and terminating numbers themselves, a computer check of a database identifies the long-distance company assigned to carry calls for any given number, the so-called "primary interexchange carrier" (PIC) for that number. All of these pieces of information are recorded in the electronic record of the call (the "message record") generated by the switch for later billing or other purposes.

AT&T's patent uses the term "PIC indicator" as the name for the answer to the following question: is the

terminating number's PIC the same as a "predetermined" PIC? If the "predetermined" PIC in this question is the originating number's PIC, the PIC indicator simply gives the answer to the question: does the same long-distance carrier carry the long-distance calls for both of the two numbers ot the phone call? Moreover, the "predetermined" PIC, the one to which the terminating number's PIC is being compared, can also be a specific designated long-distance carrier, such as AT&T, MCI/Worldcom, or Sprint, in which case the "PIC indicator" is the answer to the question: does a specific designated long-distance carrier carry the long-distance calls for the terminating number? Regardless of what the "predetermined" PIC is, the PIC indicator is nothing more than a "yes" (or its equivalent) if a match in comparing two numbers or data is found, a "no" (or its equivalent) if not. *See* Patent Document Appendix, Figs. 3 and 7 (truth tables). As the Federal Circuit recognized, this method of generating the PIC indicator is simply an implementation of the most basic logical operation, the AND operation of Boolean mathematics) (familiar from, *e.g.*, Westlaw and Lexis searches for "Word A and Word B"). Pet. App. 12a ("Excel argues, correctly, that the PIC indicator value is derived using a simple mathematical principle (p and q).").[1]

[1] Expressed symbolically as "$p \wedge q$," this principle results in "a proposition that is true precisely when both p and q are true, and is false otherwise." ENCYCLOPEDIA OF COMPUTER SCIENCE at 136 (Anthony Ralston *et al.* eds., 1993). The AND operator functions according to the following "truth table":

| p | q | $p \wedge q$ |
|---|---|---|
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

IEEE STANDARD DICTIONARY OF ELECTRICAL AND ELECTRONIC TERMS 33 (6th ed. 1996).



In 1994, AT&T obtained U.S. Patent No. 5,333,184 (the '184 patent) for the "method" of including the PIC indicator—the yes/no answer to the simple comparison of data—in the record of a long-distance call. In Claim 1, AT&T claimed as its invention:

> A method for use in a telecommunications system in which interexchange calls initiated by each subscriber are automatically routed over the facilities of a particular one of a plurality of interexchange carriers associated with that subscriber, said method comprising the steps of:
>
> generating a message record for an interexchange call between an originating subscriber and a terminating subscriber, and
>
> including, in said message record, a primary interexchange carrier (PIC) indicator having a value which is a function of whether or not the interexchange carrier associated with said terminating subscriber is a predetermined one of said interexchange carriers.

Claim 6 is slightly narrower, requiring, in addition to the recording process of Claim 1, the further step of "billing at least ones [sic] of said calls as a function of the value of the PIC indicator in the message record generated for each one of those calls." Patent Document Appendix at 7. None of the claims at issue describes a physical apparatus or machine. They are pure method claims.[2]

### B. District Court Proceedings

Excel sells long-distance telephone services. It owns no switches or transmission facilities of its own, but contracts with facilities-based carriers like MCI to carry the long-distance calls made by Excel customers. "Switchless re-

[2] This litigation involves ten of the '184 patent's 41 claims (numbers 1, 4, 6, 12, 13, 15, 18, 19, 21, and 40), all method claims.

sellers" like Excel are regulated as common carriers under the Communications Act of 1934, 47 U.S.C. § 151 *et seq.*

On August 30, 1996, AT&T filed suit in the United States District Court for the District of Delaware, invoking jurisdiction under 28 U.S.C. §§ 1331 and 1338 and charging Excel with infringing certain claims of the '184 patent. Excel denied liability and counterclaimed for a declaration that the asserted claims of the '184 patent are invalid and not infringed. On December 5, 1997, Excel moved for summary judgment of invalidity, arguing, among other things, that AT&T's method claims were not patentable subject matter under 35 U.S.C. § 101.

On March 27, 1998, the district court granted Excel's motion for summary judgment of invalidity for lack of patentable subject matter. Pet. App. 34a-36a. The court followed the established standards recognizing that mathematical algorithms, as a kind of abstract idea or law of nature, are outside the ambit of patentable subject matter under Section 101. Specifically, the court relied on this Court's *Benson-Flook-Diehr* trilogy (*Gottschalk v. Benson*, 409 U.S. 63 (1972); *Parker v. Flook*, 437 U.S. 584 (1978); *Diamond v. Diehr*, 450 U.S. 175 (1981)) for the principle that the "clue to patentability" of a process making use of a mathematical algorithm is whether the process involves the "[t]ransformation and reduction of an article 'to a different state of thing.'" Pet. App. 30a. The district court also sought guidance from the decisions of the Federal Circuit and its predecessor, the Court of Customs and Patent Appeals, implementing the rule set forth under *Benson*, *Flook*, and *Diehr*. In particular, the district court noted that

> [a]mong its various attempts to articulate the test for § 101 patentability, the Federal Circuit in *In re Schrader* stated that "[t]he dispositive issue" in reviewing patentability under § 101 "is whether the claim as a whole *recites sufficient physical activity to* constitute patentable subject matter."



Pet. App. 31a (emphasis added) (quoting *In re Schrader*, 22 F.3d 290, 294 n.9 (Fed. Cir. 1994), citing *In re Grams*, 888 F.2d 835, 839 (Fed. Cir. 1989)).

The district court applied those principles to invalidate AT&T's process claims in this case. Explaining that "the crux of the invention is to include a 'PIC indicator' on the standard EMI [electronic message interface] message record" and that the PIC indicator is the product of a simple mathematical operation, the court determined that the claims at issue at the very least "implicitly recite a mathematical algorithm." Pet. App. 25a, 32a. The court then concluded that the claimed method lacks any physical steps in connection with generating a PIC indicator, that the PIC information itself was not physically changed or transformed in any substantive way by the claimed method, and that the mere recording of the PIC indicator in telecommmunication switches and computers did not add anything that would impart patentability under Section 101. Pet. App. 33a-34a. The district court accordingly entered judgment of invalidity under Section 101.

### C. Court of Appeals Decision

The court of appeals reversed. Prior to completion of the briefing on appeal, the Federal Circuit issued its *State Street* decision. There, the Federal Circuit proposed that determining the patentability of claims employing a mathematical algorithm should focus "on the essential characteristics of the subject matter, in particular, its practical utility." 149 F.3d at 1375. In that regard, the court explained that "[u]npatentable mathematical algorithms are identifiable by showing they are merely abstract ideas constituting disembodied concepts or truths that are not 'useful.' From a practical standpoint, this means that to be

patentable an algorithm must be applied in a 'useful' way." *Id.* at 1373.

The court in *State Street* repudiated the longstanding *Freeman-Walter-Abele* test (*see In re Freeman*, 573 F.2d 1237 (C.C.P.A. 1978); *In re Walter*, 618 F.2d 758 (C.C.P.A. 1980); *In re Abele*, 684 F.2d 902 (C.C.P.A. 1982)), which had been "adopted by th[e] court, to extract and identify unpatentable mathematical algorithms in the aftermath of *Benson* and *Flook*." 149 F.3d at 1374.[3] According to *State Street*, that test now "has little, if any, applicability to determining the presence of statutory subject matter." *Id.* In reaching that result, the court explained that "after *Diehr* and [*In re*] *Alappat*[, 33 F.3d 1526 (Fed. Cir. 1994) (en banc)], the mere fact that a claimed invention involves inputting numbers, calculating numbers, outputting numbers, and storing numbers, in and of itself, would not render it nonstatutory subject matter, unless, of course, its operation does not produce a 'useful, concrete and tangible result.'" *Id.*

To the extent that the pronouncements in *State Street* purported to reach process claims, they were *dicta*, because the patent at issue in *State Street* actually was for a machine—and not just for some abstractly characterized machine that added nothing of significance to a process. The claims were written in "means plus function" form under 35 U.S.C. § 112, ¶ 6, so that, by definition, they were limited to the specific machine described in the written description part of the patent plus equivalents. *See Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 27-28 (1997) (discussing Section 112, ¶ 6). Pure method claims, involving no specific apparatus at

[3] The *Freeman* formulation was based on this Court's *Benson* decision. *Walter* then adapted it to reflect this Court's subsequent *Flook* decision. *Abele* further adopted the formulation after this Court decided *Diehr*.



all, but only a sequence of steps, were not at issue in *State Street*. The patentee, having originally included method claims in its application to the PTO, dropped those claims specifically to avoid rejection under Section 101.[4]

In this case, the Federal Circuit took the *State Street* pronouncements, made in the context of apparatus claims, and established them as the law for pure process claims, applying them to uphold the validity of the method claims of AT&T's patent. The court recognized that the data comparison to derive the PIC indicator was simple Boolean mathematics (Pet. App. 12a), but it then noted that "[t]he PIC indicator represents information about the call recipient's PIC, a useful, non-abstract result that facilitates differential billing of long-distance calls" (Pet. App. 13a). *See also* Pet. App. 12a (stating that "AT&T's claimed process employs subscribers' and call recipients' PICs as data, applies Boolean algebra to those data to determine the value of the PIC indicator, and applies that value through switching and recording mechanisms to create a signal useful for billing purposes"). The usefulness of the result of the Boolean operation, the court held, was legally sufficient to permit patenting under Section 101. "Because the claimed process applies the Boolean principle to produce a useful, concrete, tangible result without pre-empting other uses of the mathematical principle, on its face the claimed process comfortably falls within the scope of § 101." Pet. App. 13a.

[4] The court in *State Street* noted that the original patent application contained six "machine claims" and six method claims. The applicant had canceled the six method claims because "during prosecution the examiner contemplated a § 101 rejection for failure to claim statutory subject matter" 149 F.3d at 1371. Like the asserted claims of the present case, the canceled claims in *State Street* were method claims defined by steps involving receiving, processing, and storing data.

In reaching this conclusion, the court deemed it irrelevant that AT&T was not claiming the use of a mathematical operation to produce a physical transformation of any specified physical things—in contrast, for example, to the steps for curing rubber that were involved in *Diehr*. *See* Pet. App. 12a-14a. In generating a PIC indicator by comparing PIC data according to a mathematical operation, the claimed method does not physically change the underlying PIC data itself into something else; it merely records the answer to a mathematical question (in an unspecified format or apparatus). In decisions before this case and *State Street*, the Federal Circuit and its predecessor had recognized, in discussing pure process claims, that mere usefulness of a mathematical algorithm, mere recording of the result of such an algorithm, mere use of a generically referenced computer (which always involves some internal transformation of electrical states), and mere restriction of the field of use of an algorithm—all these were insufficient to take a mathematical process outside the public domain. *See In re Sarkar*, 588 F.2d 1330, 1335 (C.C.P.A. 1978); *In re Walter*, 618 F.2d at 769-70; *Schrader*, 22 F.3d at 294; *Arrhythmia Research Tech. v. Corazonix Corp.*, 958 F.2d 1053, 1057 (Fed. Cir. 1992); *see also In re Warmerdam*, 33 F.3d 1354, 1360 (Fed. Cir. 1994). Nevertheless, the Federal Circuit in this case deemed the practical usefulness of the recorded result of the data comparison sufficient to allow the process to be claimed in a patent and thus removed from the public domain.

## REASONS FOR GRANTING THE PETITION

This case raises an important and fundamental question of patent law that this Court has not addressed in nearly two decades. The Federal Circuit has for the first time held that any pure method, even execution of a mathematical algorithm, constitutes patentable subject matter



as long as the result of the operation has a practical utility. This standard works a major change in the law, as it sweeps aside the pre-existing law of the Federal Circuit.

Lacking recent guidance, the Federal Circuit felt free to declare this Court's precedents outmoded and thus to supersede them. Notably, it repudiated this Court's repeatedly affirmed principle, emphasized in the 1981 *Diehr* decision itself (this Court's most recent decision on this issue), that the touchstone for patentability of a process that uses a mathematical algorithm is whether the process effects a physical transformation of an article into a different state or thing (like the rubber-curing process in *Diehr*). Moreover, what the Federal Circuit put in place —requiring only practical utility of the result of the mathematical operation—is essentially no standard at all, thus effectively erasing the longstanding bar on patenting of mathematical operations.

The magnitude of the change in law worked by the new Federal Circuit standard is already evident. There has been a dramatic increase in software patent filings in the U.S. Patent and Trademark Office since *State Street* —in an area where prior art is not readily available for the usual process of PTO examination to ensure novelty and nonobviousness. More generally, the new standard will permit the patenting of a host of computer-implemented methods that until now have remained beyond the reach of the exclusive rights granted under the patent laws. This kind of change should not be allowed to stand unreviewed by this Court.

**I. The Federal Circuit Has Definitively And Dramatically Broken With Its Own Precedents In Now Extending Patent Protection To All Methods, Even Mathematical Algorithms, As Long As They Are Applied In A Useful Way**

The Federal Circuit's ruling in this case is a watershed event in the standards for patentability of pure *processes* that involve mathematical operations. The Federal Circuit signaled the change as *dicta* in 1998 and adopted it here. The new standard, demanding only utility of the mathematical method, intentionally and unquestionably breaks sharply with pre-existing limits on patentability.

1. Until 1998, the Federal Circuit and its predecessor followed the analytical path marked out by this Court prior to 1981. They demanded, for patentability of a process involving mathematical operations, that the claimed process involve "physical . . . process steps." The standard approach, known as the *Freeman-Walter-Abele* test, incorporated two steps:

> First, the claim is analyzed to determine whether a mathematical algorithm is directly or indirectly recited. Next, if a mathematical algorithm is found, the claim as a whole is further analyzed to determine whether the algorithm is "applied in any manner to physical elements or process steps," and, if it is, it "passes muster under § 101."

*In re Pardo*, 684 F.2d 912, 915 (C.C.P.A. 1982) (quoting *Walter*, 618 F.2d at 767); *see In re Meyer*, 688 F.2d 789, 796 (C.C.P.A. 1982).

In 1998, after a period of almost five years of quiet on the subject, the Federal Circuit "reassessed" the patentability of mathematical algorithms in *State Street*. Pet. App. 9a. The only claims actually at issue were "directed to a machine," in accordance with 35 U.S.C. § 112, ¶ 6, namely, "a data processing system for managing a financial services configuration of a portfolio established as a partnership, which machine is made up of, at the very least, the specific structures disclosed in the written description and corresponding to the means-plus-function elements . . . recited in the claim." *State Street*, 149 F.3d at 1371, 1372. The patentee had, in fact, canceled its initially proposed *process* claims during prosecution of the patent application, after the PTO questioned their patentability under Section 101. *See* note 4, *supra*. The Federal Circuit, recognizing that "[a] 'machine' is proper statutory subject matter under § 101" (149 F.3d at 1372), held that the claimed machine did not fall within any of the unpatentable categories of laws of nature, natural phenomena, or abstract ideas, including mathematical operations, because it was a new and useful machine capable of producing a concrete and tangible result to solve a practical problem. *Id.* at 1373.



Although only a machine was at issue in *State Street* (as was also the case in the 1994 *Alappat* decision), the *State Street* court did not confine its discussion to machines. Rather, it proposed to alter the test for the patentability of even pure processes that use a mathematical algorithm, requiring only that the algorithm be "applied in a 'useful' way." *Id.* at 1373. Acknowledging that the "*Freeman-Walter-Abele* test was designed by the Court of Customs and Patent Appeals, and subsequently adopted by this court, to extract and identify unpatentable mathematical algorithms in the aftermath of *Benson* and *Flook*," the Federal Circuit nevertheless stated that, today, this "test has little, if any, applicability to determining the presence of statutory subject matter." *Id.* at 1373-74.

When certiorari was sought to review *State Street* and its pronouncements purporting to change the legal standards under Section 101 (Case No. 98-657), the patentee, in opposing certiorari, relied centrally and repeatedly on

the fact that the case actually involved a machine, not a process.[5] That distinction—which was critical to sidestepping the importance (and incompatibility with this Court's precedents) of the *dicta* suggesting new patentability standards for processes [6]—was well founded in logic and precedent. Mathematical algorithms are themselves a type of "process," not a "machine, manufacture, or composition of matter" (§ 101), so the latter categories do not implicate the longstanding prohibition on patenting algorithms (unless they are so generically identified as to add nothing substantial).[7] Not surprisingly, then, challenges to patentability of machines, as in *State Street*,

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[5] According to the patentee (respondent), "the question posed by State Street is solely an academic question and granting the writ would bring before this Court a hypothetical issue that the Federal Circuit did not decide." 98-657 Br. in Opp. 7; *see also id.* at i (rewriting question presented to stress "machine"), 5 ("The Question Presented by State Street Is Hypothetical and Was Not Determinative of the Federal Circuit's Decision"; State Street's entire argument for certiorari is based upon a flawed reading of the Federal Circuit's decision."), 6-7 (stressing that Federal Circuit's decision was limited to "a new 'machine' and not a 'process' "; "State Street distorts selected dicta to create an issue that was not before the Federal Circuit.").

[6] Counsel for the patentee in *State Street* has recently acknowledged that the new utility standard, as applied to processes, cannot reasonably be squared with this Court's decisions in *Flook* and *Benson*. *See* note 10, *infra*.

[7] *See In re Noll*, 545 F.2d 141, 148 (1976) (apparatus claims cannot read on an algorithm itself); *see also Alappat*, 33 F.3d at 1545 ("a computer . . . is apparatus not mathematics"). The Federal Circuit and its predecessor court have questioned whether the "mathematical algorithm" exception even applies to apparatus claims. 33 F.3d at 1542 (noting that "the PTO has failed to support the premise that the 'mathematical algorithm' exception applies to true apparatus claims"); *In re Johnston*, 502 F.2d 765, 771 (C.C.P.A. 1974) (holding that the "mathematical algorithm" exception does not apply to apparatus claims), *rev'd on other grounds*, *Dann v. Johnston*, 425 U.S. 219 (1976).



have routinely failed.[8] This Court denied the petition in *State Street*. 119 S. Ct. 851 (1999).

After certiorari was denied in *State Street*, the Federal Circuit in this case took the decisive step of crossing the machine-process line and elevating the *dicta* about processes in *State Street* into a holding. The Federal Circuit not only announced the new usefulness test but applied it to uphold the patentability of the method claims at issue here. In rationalizing its abandonment of the conventional physical limitations test, the court echoed its reasoning from *State Street* that, "[w]hatever may be left of the earlier test, if anything, this type of physical limitations analysis seems of little value" any longer. Pet. App. 15a. The Federal Circuit's decision in this case thus established the transformation of Section 101 principles as the governing law for pure software and other process claims.

2. This new utility standard for patentability of pure processes that are nothing but mathematical operations is a sharp break from the pre-existing law. The Federal Circuit acknowledged the "reassessment" of standards in this case. Pet. App. 8a-9a. And it is clear that the new standard repudiates the Federal Circuit's pre-1998 analysis and pre-1998 holdings regarding claims for pure processes that involved mathematical algorithms.

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[8] It appears that challenges have failed in *every* reported instance in which the patentability of a true apparatus claim under Section 101 was at issue. *E.g.*, *State Street*, 149 F.3d 1368 (personal computer for managing financial services configuration); *Alappat*, 33 F.3d at 1541 ("a machine, namely, a rasterizer"); *Arrhythmia Research Tech. v. Corazonix Corp.*, 958 F.2d 1053 (Fed. Cir. 1992) (machine for analyzing electrocardiographic signals); *In re Iwahashi*, 888 F.2d 1370 (Fed. Cir. 1989) (machine: an auto-correlation unit); *In re Bradley*, 600 F.2d 807 (C.C.P.A. 1979) (computer), *aff'd*, 450 U.S. 381 (1981); *In re Johnston*, *supra* (record keeping machine consisting of a programmed digital computer).

Most recently, in *In re Schrader*, 22 F.3d 290, 295 (Fed. Cir. 1994), which invalidated a patent on this ground, the Federal Circuit embraced "[t]he requirement that in a process claim compliance with § 101 requires some kind of transformation or reduction of subject matter." The court explained:

> When Congress approved the addition of the term "process" to the categories of patentable subject matter in 1952, it incorporated the definition of "process" that had evolved in the courts. As of 1952, *that term included a requirement that there be a transformation or reduction of subject matter.*

*Id.* (emphasis added). "This basic requirement preceded and remains a part of the requirements incorporated in the 1952 Act." *Id.*

The requirement of a physical transformation or reduction had been stated in *Abele*, the third of the *Freeman-Walter-Abele* trilogy, after this Court's last pronouncement on the subject in the 1981 *Diehr* decision. *See Abele*, 684 F.2d at 906. Following that principle, moreover, the Federal Circuit and its predecessor, in discussing pure process claims, had repeatedly stated that mere usefulness of a mathematical algorithm, mere recording of the result of such an algorithm, mere use of a generically referenced computer, and mere restriction of the field of use of an algorithm were insufficient to take a mathematical process outside the public domain. *See In re Sarkar*, 588 F.2d at 1335; *Walter*, 618 F.2d at 769-70; *Arrhythmia Research*, 958 F.2d at 1057; *Schrader*, 22 F.3d at 294; *In re Warmerdam*, 33 F.3d at 1360-61; *In re Grams*, *supra*. The Federal Circuit's new standard renders those limitations a dead letter.

The Federal Circuit all but explicitly acknowledged in this case that its new usefulness test cannot be reconciled



with prior governing standards, reflected in at least three decisions invalidating pure process claims after *Diehr*, namely, *In re Grams*, *In re Schrader*, and *In re Warmerdam*. *See* Pet. App. 16a-17a. It made no attempt to explain how the holdings of those cases could be squared with its new test. As to the first two, the court merely declared them "unhelpful" because they did not apply the mere "useful result" standard as a sufficient test for patentability. *Id.* That dismissal, being entirely circular, is another form of words stating that the standards of *Grams* and *Schrader* are incompatible with the new standard. As to *Warmerdam*, the court simply threw up its hands, making no effort to identify a principle that would accommodate the earlier invalidity holding: the court refused even to ask what features were missing from the claims there that would distinguish them from unpatentable mathematical operations or whether the same features were missing here.

In fact, what was missing in all three cases was sufficient physical activity or transformation, and all three of the cases would have been decided differently under the new usefulness standard. In *Grams*, whereas the diagnosing method at issue was held unpatentable because it recited no physical steps except for merely gathering data for the mathematical algorithm, the algorithm clearly produced a useful, concrete, and tangible result, *i.e.*, an indication whether a system's condition is normal or abnormal, and, if it is abnormal, the cause of the abnormality. 888 F.2d at 836. Similarly, in *Schrader*, whereas the claimed method for competitive bidding on multiple auction items was held unpatentable because it failed to recite sufficient physical activity or transformation of data. the mathematical algorithm underlying the bidding method was manifestly applied in a useful way, *i.e.*, in conducting auctions. 22 F.3d at 291, 293-94. Finally, in *Warmer-*

*dam*, whereas the claimed method was held unpatentable because it was "mathematical in nature" and did not recite a sufficient level of physical activity to impart patentability (33 F.3d at 1360),[9] the method was indisputably and directly useful in controlling the motion of robotic machines to avoid collisions with other moving or fixed objects. *Id.* at 1355. The Federal Circuit's decision in this case unquestionably makes a dramatic change in the pre-existing legal standards to permit patenting of what previously belonged in the public domain.

### II. The New Practical Utility Standard Repudiates The Governing Precedents Of This Court

The Federal Circuit's new usefulness standard for identifying patentable methods is a repudiation of this Court's precedents. This Court has made clear that patentability of an otherwise nonstatutory method claim is not saved by reciting a practical application of the method. At the same time, the Court has stressed that, to distinguish an unpatentable mathematical process from a patentable technological one, the touchstone is that the claims describe a process for physically transforming a physical article or reducing it to a different state or thing. The Federal Circuit's decision casts away these principles and adopts a standard that is inconsistent with both the results and rationales of several of this Court's decisions. And, contrary to the Federal Circuit's core assumption (belied by 20 years of Federal Circuit case law), neither the principles nor the holdings of those decisions were abrogated by this Court in *Diehr*.

1. This Court flatly concluded in its 1978 decision in *Flook*: "if a claim is directed essentially to a method of

[9] By contrast, the court concluded that a different claim, for a *machine*, in *Warmerdam* was "clearly patentable subject matter." *Id.* at 1360.



calculating, using a mathematical formula, *even if the solution is for a specific purpose*, the claimed method is nonstatutory." 437 U.S. at 595 (emphasis added) (citing *In re Richman*, 563 F.2d 1026, 1030 (C.C.P.A. 1977)). The Court reiterated *Flook*'s rejection of a usefulness standard in the course of its general discussion of patentability in *Diamond v. Chakrabarty*, 447 U.S. 303 (1980), confirming that *Flook* "applied [the Court's] prior precedents to determine that a 'claim for an improved method of calculation, *even when tied to a specific end use*, is unpatentable subject matter under § 101.'" 447 U.S. at 315 (emphasis added). The Federal Circuit's new standard is directly to the contrary.

The new standard also discards the longstanding requirement of a physical transformation for patentability of a "process" (a term expressly used in Section 101 since 1952, having previously been covered by the prior statutory term "art," *see Diehr*, 450 U.S. at 182). This Court and the leading treatise articulated that requirement for processes even before 1900. *See Cochrane v. Deener*, 94 U.S. 780, 787-88 (1877) ("A process is a mode of treatment of certain materials to produce a given result. It is an act, or a series of acts, performed upon the subject-matter to be transformed and reduced to a different state or thing"); 1 William C. Robinson, THE LAW OF PATENTS FOR USEFUL INVENTIONS § 159 (1890) (stating that a patentable process "is an act or a series of acts performed by some physical agent upon some physical object, and producing in such object some change either of character or of condition"). In the 1972 decision in *Benson*, this Court confirmed this settled principle, stating that the "[t]ransformation and reduction of an article 'to a different state or thing' *is the clue to the patentability* of a process claim that does not include particular machines." *Benson*, 409 U.S. at 70 (emphasis added).

The Federal Circuit's usefulness standard not only flouts this Court's articulated standards but contradicts the holdings of *Benson* and *Flook*, which would have come out differently under the new Federal Circuit standard.[10] In *Benson*, the algorithm used to convert binary-coded decimal numerals into pure binary numerals produced obviously useful results: numerals that could be used in the electronic on-off circuits on which digital computers are based. 409 U.S. at 64, 71; *see also Diehr*, 450 U.S. at 185 (the "sole practical application of the algorithm [in *Benson*] was in connection with the programming of a general purpose digital computer"); *Flook*, 437 U.S. at 590 n.11 (in "*Benson* there was a specific end use contemplated for the algorithm—utilization of the algorithm in computer programming"). The usefulness of the algorithm in computer applications would be enough under the Federal Circuit's standard. This Court held, however, that the claimed method was merely an abstract idea and so was not protectable under the patent laws.

In *Flook*, the algorithm for computing numerical "alarm limits" produced a useful result: indeed, these numbers generated by the algorithm were specifically intended to have a practical application in chemical processes involving catalytic conversion. 437 U.S. at 586. That utility

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10 Counsel for State Street Bank & Trust Co. (the patentee in *State Street*) has admitted as much in recent public statements to the patent bar. According to State Street's counsel, "[w]e believe that *Benson* was wrongly decided. Under *State Street*, it is hard to imagine a more useful 'real world' application of an algorithm than the *Benson* invention which is now a critical widespread part of computer technology." Steven L. Friedman et al., *State Street Bank and Trust Company v. Signature Financial Group, Inc.: At the Intersection of Technology, Commerce and the Law*, AMERICAN BAR ASSOCIATION SECTION OF INTELLECTUAL PROPERTY LAW NEWSLETTER (Spring 1999) 16 n.1. Similarly, "[l]ike *Benson*, . . . we believe *Parker* would come out in reverse under [the Federal Circuit's] analysis in *State Street*." *Id.* at 16 n.4.



would be enough under the Federal Circuit's standard. This Court held, however, that the method claims were unpatentable because they claimed nothing more than abstract ideas. *Id.* at 594-95.

2. The Federal Circuit did not seriously contest the inconsistency of its new standard with *Benson* and *Flook*. Instead, the court presumed that, subsequent to those decisions, "[i]n *Diehr*, the Court expressly limited its two earlier decisions in *Flook* and *Benson*." Pet. App. 9a. This revisionist reading of *Diehr*, after 20 years, contradicts the Federal Circuit's own recognition that "*Benson* remains the law. Indeed, *Benson* is cited in both *Diehr* and *Chakrabarty*, with no apparent attempt in either opinion to overrule or disapprove of it." *Grams*, 888 F.2d at 838; *see also Warmerdam*, 33 F.3d at 1358 (citing *Diehr* with approval as support for the continuing viability of *Benson* and *Flook*). And this new view of *Diehr* is wrong: nothing in *Diehr* even purports to overrule *Benson* and *Flook* or disavow their results; to the contrary, *Diehr* strongly confirms the principles *Benson* and *Flook* articulate in each respect that is critical to the present case.

At the most general level, *Diehr* treats *Benson* and *Flook* as proper applications of the basic exclusion of laws of nature and abstract ideas, including mathematical algorithms, from the protection of the patent laws. Thus, *Diehr* reaffirms the principle that "laws of nature, natural phenomena, and abstract ideas" are "free to all men and reserved exclusively to none" and that included within those unpatentable categories are mathematical algorithms, formulas, and/or equations. 450 U.S. at 185-86. And far from declaring *Benson* and *Flook* to be wrong, *Diehr* explains their results as applications of "these long-established principles." 450 U.S. at 185; *see id.* at 185-87.

More specifically, *Diehr*, far from disavowing the physical-transformation test, specifically relies on that test to uphold patentability. *Diehr* quotes with approval the statements of the 1877 *Cochrane* decision and the 1972 *Benson* decision that a patentable "process" is one "performed upon the subject-matter to be transformed and reduced to a different state or thing" (*Cochrane*, 94 U.S. at 787-88) and that "[t]ransformation and reduction of an article 'to a different state or thing' is the clue to the patentability of a process claim that does not include particular machines" (*Benson*, 409 U.S. at 70). *Diehr*, 450 U.S. at 183-84. The decision then affirms the patentability of the respondents' process claims by "[a]nalyzing respondents' claims according to the above statements from our cases" and concluding that the claimed "physical and chemical process for molding precision synthetic rubber products" is patentable precisely because the claimed process "involve[s] the transformation of an article, in this case raw, uncured synthetic rubber, into a different state or thing." *Id.* at 184. *Diehr* thus expressly relies on physical transformation—and articulates no other basis for patentability anywhere else in the opinion—as the ground for upholding the patent against the Section 101 objection. *Diehr* can only be read as reaffirming, rather than abandoning, the physical-transformation test of *Benson* and *Cochrane*.[11]

[11] In its general summary, the Court concludes its opinion by stating: "when a claim containing a mathematical formula implements or applies that formula in a structure or process which, when considered as a whole, is "performing a function which the patent laws were designed to protect (*e.g.*, transforming or reducing an article to a different state or thing), then the claim satisfies the requirements of § 101." 450 U.S. at 192. The Federal Circuit fastened on the "*e.g.*" in the parentheses and interpreted it as a repudiation of the physical transformation test as the touchstone of patentability for a process. That interpretation is untenable, given *Diehr's* express reliance on that test as the basis for its decision, the absence of any other articulated test in *Diehr*, and the lack of any justification for concluding—as the Federal Circuit's interpretation does—that the prior decisions in *Cochrane* and *Benson* were being overruled.



Just as *Diehr* leaves in place and reinforces the physical-transformation standard, it also leaves in place and reinforces *Flook*'s recognition that patentability cannot be created for a mathematical operation simply by designating a practical use. Indeed, *Diehr* expressly reaffirms, with a citation to *Flook*, that the principle precluding patenting of mathematical formulas "cannot be circumvented by attempting to limit the use of the formula to a particular technological environment." 450 U.S. at 191. Elaborating, *Diehr* then declares: "A mathematical formula does not suddenly become patentable subject matter simply by having the applicant acquiesce to limiting the reach of the patent for the formula to a particular technological use." *Id.* at 192 n.14. *Diehr* adds: "A mathematical formula in the abstract is nonstatutory subject matter regardless of whether the patent is intended to cover all uses of the formula or only limited uses." *Id.* These declarations, set out specifically to explain *Diehr*'s consistency with *Flook*, can only be read as reaffirming rather than overturning the critical principle of *Flook* that the new Federal Circuit standard disowns.[12]

3. The Federal Circuit's adoption of a usefulness standard in place of a physical transformation standard thus refuses to honor several of this Court's decisions, treating them as effectively defunct. In addition to the fact that those decisions respect historically well-founded limits on what the patent laws allow to be removed from the public

[12] *Diehr* also notes that "a mathematical formula does not become patentable subject matter merely by including in the claim for the formula token postsolution activity such as the type claimed in *Flook*." 450 U.S. at 192 n.14. Recording the answer to the mathematical operation and using the answer to send out a bill are undoubtedly "token postsolution activity."

domain, this Court has in no way overruled them, but instead has reaffirmed them in the critical respects. The Federal Circuit could not properly disregard those precedents, notwithstanding its evident (but hardly explained) conclusion that the time had come for a change in the law. This Court often has made clear that a lower court, while free to criticize, is obligated to follow this Court's precedents until this Court overrules them. *See, e.g., State Oil Co. v. Khan*, 118 S. Ct. 275, 284 (1997) ("The Court of Appeals was correct in applying that principle despite disagreement with [earlier Supreme Court precedent], for it is this Court's prerogative alone to overrule one of its precedents."); *Rivers v. Roadway Express, Inc.*, 511 U.S. 298, 312 (1994) ("It is this Court's responsibility to say what a statute means, and once the Court has spoken, it is the duty of other courts to respect that understanding of the governing rule of law."); *Rodriguez de Quijas v. Shearson/American Express, Inc.*, 490 U.S. 477, 484 (1989) ("If a precedent of this Court has direct application in a case, yet appears to rest on reasons rejected in some other line of decisions, the Court of Appeals should follow the case which directly controls, leaving to this Court the prerogative of overruling its own decisions.").

### III. The Federal Circuit's Decision Effects A Major Change In The Law That Should Be Left To Congress

The Federal Circuit's new usefulness standard essentially erases one of the age-old and "rigorous statutory tests for the issuance of a patent." *Kewanee Oil Co. v. Bicron Corp.*, 416 U.S. 470, 476-77 (1974). Not many mathematical algorithms or formulas (excluding the purest of pure mathematics) would fail to become patentable under the Federal Circuit's new standard. "A competent draftsman could attach some form of post-solution activity to almost any mathematical formula,"



this Court noted in *Flook*, adding that such a result is inconsistent with long-standing limits on patentability: "the Pythagorean theorem would not have been patentable, or partially patentable, because a patent application contained a final step indicating that the formula, when solved, could be usefully applied to existing surveying techniques." 437 U.S. at 590. The new Federal Circuit standard weakens to the point of elimination the historic preservation of mathematical operations for free use by the public.

The practical consequences of the Federal Circuit's new standard for pure process claims, first signaled in *dicta* in *State Street*, are already evident within the PTO. Commentators have reported that "[a]s the aftershock of *State Street* subsides, the avalanche of new software patent issuances and litigation begins." Raymond Van Dyke, *Software Patents Offer Opportunities and Obstacles*, THE NATIONAL LAW JOURNAL at C19 (May 24, 1999). The *State Street* decision "appears to have set off a stampede to the patent office, which reports a 45 percent increase in the number of data processing and computer-related patents issued during its 1998 fiscal year, which ended on Sept. 30." John T. Aquino, *Patently Permissive*, ABA JOURNAL at 30 (May 1999); *see also* Brenda Sandburg, *Speed over Substance?* INTELLECTUAL PROPERTY MAGAZINE (March 1999) ("The number of issued software patents in general has skyrocketed. Software patents are included in the PTO's data processing and computers and communications group. This entire group had the largest increase in issued patents last year, up 40 percent to 22,930 issued patents."); Andrew B. Katz, *"State Street" May Place Start-Ups in Peril*, NEW YORK LAW JOURNAL at C1 (Jan. 19, 1999) (reporting that "the number of software patent applications rose sharply in the few months since *State Street* and the PTO predicts a dramatic increase in the future").

The sharp increase in software patent applications confirms the real-world significance of what the Federal Circuit has done to longstanding limits on patentability. The increase necessarily will continue, and not only because companies throughout the myriad industries where software is important will want the right to exclude that is the essence of patent protection. *See* 35 U.S.C. §§ 154, 271; *see also Florida Prepaid Post-Secondary Education Expense Bd. v. College Savings Bank*, 67 U.S.L.W. 4580, 4584-85 (U.S. 1999). Recognition of patentability also creates pressure within all such industries to seek such patents merely for self-protective purposes.

A large-scale expansion of the scope of what is patentable subject matter, especially one that involves an already-mature technology, implicates just the kind of substantial issues that ought to be left for Congress. In such circumstances, the PTO may have a distinctly limited ability to identify and locate the existing prior art (which patent applicants are under no duty themselves to uncover if not already known), thus curtailing the critical basis for determining whether a patent claim fails the statutory requirements of novelty and nonobviousness (35 U.S.C. §§ 102, 103). This problem affects pure process claims for computer software particularly. "Because software inventions were denied patent protection for so long and so few patents have issued thus far, patent examiners often cannot review previous archived patents in the software arts to assess whether an invention satisfies the requirements of a patent" under Sections 102 and 103 of the patent statute. Van Dyke, *supra*, at C20.[13] The problem is not just unavailability of earlier

[13] The PTO recently conducted hearings on the problems raised by increased software patents, noting that "[e]merging technologies, such as telecommunications and the computer-related arts, present challenges in searching and identifying the most relevant prior art." Notice of Public Hearing and Request for Comments on Issues Related to the Identification of Prior Art During Examination of a Patent Application, 64 Fed. Reg. 28803, 28804-05 (U.S. Patent & Trademark Office May 27, 1999).



patents as prior art, but prior-art literature more generally. *See* David Bender, *Recent Developments in Software Patents* in COMPUTER SOFTWARE PROTECTION (PLI 1997) at 139, 159-60.[14] The built-in tendency is toward an excess of issued patents (because invalidating prior art that exists cannot be found)—patents that then come to court, in any infringement litigation, with a presumption of validity (35 U.S.C. § 282).[15]

More generally, even aside from problems in identifying prior art, the Federal Circuit's decision swinging open the door to pure process claims for software will, by design, introduce new areas of private exclusivity over software in many industries, raising serious questions about

[14] "In most technical areas descriptions of developments quickly become the subject of patent applications, technical journals and eventually textbooks. However, this phenomenon is much less evident in the software arts. Software advances are typically maintained as secrets in-house, or embodied in software packages made available widely, but only in object form. Until the past few years, such developments have not typically been the subject of patents or publications. And even where the public has been permitted to use the development, the public has often been kept ignorant of its content and, consequently, is unable to build upon it."

"One negative ramification of this disinclination to publish and patent is the difficulty of assessing the state of the software art. Thus, patent examiners examining a software-related application are unable to make an accurate assessment of novelty and nonobviousness. If the representation of the prior art to which the patent examiner has access is incomplete, the process results in more patents than it should." *Id.* at 160. *See also id.* at 160-61 (noting recognition of problem in recent formation of organization to try to compile software databases).

[15] In litigation, an accused infringer challenging the validity of the patent generally must meet a "clear and convincing evidence" standard. *See Mahurkar v. C.R. Bard, Inc.*, 79 F.3d 1572, 1576 (Fed. Cir. 1996).

the consequences for competition and innovation. What protection for pure software is needed beyond what is available from, say, copyright and trade-secret laws? Should patents be issued that merely claim Internet applications of mathematical algorithms? *See, e.g.*, U.S. Patent No. 5,794,207 (patent directed to reverse seller's auction on the Internet); *compare Schrader, supra* (rejection of patent application for novel way of conducting auctions). How will the deliberately lowered standard for patentability affect an industry, like telecommunications, that is highly dependent on software and where Congress has aggressively acted to promote the entry and expansion of new competition? Not surprisingly, "there is widespread angst among companies that use (not just those that produce) cutting-edge software and communication technologies. They are worried that the government is granting exclusive rights in territory that should be open to all, and that expensive, debilitating litigation may decimate their industries." James Pooley, *Defending Internet, Software Patent Claims*, NEW YORK LAW JOURNAL, INTELLECTUAL PROPERTY SECTION at S6 (March 15, 1999).

There is today, as there has been for many decades, a vigorous, continuing debate about the proper standards for legal protection of software, whether through the patent statute or other laws.[16] This debate raises serious,

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[16] *See, e.g.*, REPORT OF THE PRESIDENT'S COMMISSION ON THE PATENT SYSTEM, "TO PROMOTE THE PROGRESS OF . . . USEFUL ARTS" IN AN AGE OF EXPLODING TECHNOLOGY (1966) (recommending against patent protection for computer programs); NATIONAL COMMISSION ON NEW TECHNOLOGICAL USES OF COPYRIGHTED WORKS, FINAL REPORT (1979) (recommending copyright as the form of intellectual property protection for computer programs); OFFICE OF TECHNOLOGY ASSESSMENT, UNITED STATES CONGRESS, FINDING A BALANCE: COMPUTER SOFTWARE, INTELLECTUAL PROPERTY AND THE CHALLENGE OF TECHNOLOGICAL CHANGE (1992) (recommending sui generis approach to software protection); Pamela Samuelson et al., *Symposium: Toward a Third Intellectual Property Paradigm: Article: A Manifesto Concerning the Legal Protection of Computer Programs*, 94 COLUM. L. REV. 2308 (1994) (arguing for a sui generis form of legal protection of computer programs).



delicate policy issues: "[f]ederal interests are threatened, not only by inadequate protection for patentees, but also when overprotection may have an adverse impact on a competitive economy. *See Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 162-163 (1989)." *Florida Prepaid Post-Secondary Education Expense Bd. v. College Savings Bank*, 67 U.S.L.W. 4580, 4586 (U.S. 1999) (Stevens, J., dissenting, joined by Souter, Ginsburg, and Breyer, JJ.). To the extent that long-settled limitations on patentability are to be overturned, it should be done in the legislative arena where the consequences can be explored and risks and benefits balanced. Such a dramatic change should not be made by the Federal Circuit—and certainly should not go unreviewed by this Court.

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*See also* Lawrence Lessig, *The Problem With Patents*, THE INDUSTRY STANDARD (May 3, 1999) (criticizing expansion of patent protection related to electronic commerce; "In a transforming market, it's nearly impossible for anyone—let alone an underpaid worker in the [PTO] who spends an average of eight hours evaluating the prior art in a patent and gets paid based on how many he processes—to identify what's 'novel.' . . . To West Coast coders, it seems bizarre that East Coast coders—the Patent Office—consider [various patented] ideas nonobvious. . . . Washington is obsessed with intellectual-property rights . . . . [O]ur tradition teaches balance and the dangers inherent in overly strong intellectual-property regimes. But balance in IP seems over for now."); National Research Council, INTELLECTUAL PROPERTY ISSUES IN SOFTWARE at 64 (1991) ("Software innovator Bricklin, creator of the original spreadsheet program, VisiCalc, believes that [software patents] could be 'very bad for the industry.' . . . Had patents been available when he and his collaborator developed VisiCalc, Bricklin speculated, their company, Software Arts, would have sought the protection. The consequences of such a decision, he further speculated, would have been to prevent other innovators from exploring different expressions of the spreadsheet idea and to handicap the competition.").

## CONCLUSION

The petition for a writ of certiorari should be granted.

Respectfully submitted,

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July 13, 1999

# APPENDICES

**APPENDIX A**

**UNITED STATES COURT OF APPEALS**
**FOR THE FEDERAL CIRCUIT**

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98-1338

AT&T CORP.,
*Plaintiff-Appellant,*

v.

EXCEL COMMUNICATIONS, INC.,
EXCEL COMMUNICATIONS MARKETING, INC.,
and EXCEL TELECOMMUNICATIONS, INC.,
*Defendants-Appellees.*

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Appealed from U.S. District Court for the
District of Delaware
Judge Sue L. Robinson

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DECIDED: April 14, 1999

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Before PLAGER, CLEVENGER, and RADER, *Circuit Judges.*

PLAGER, *Circuit Judge.*

This case asks us once again to examine the scope of section 1 of the Patent Act, 35 U.S.C. § 101 (1994).

The United States District Court for the District of Delaware granted summary judgment to Excel Communications, Inc., Excel Communications Marketing, Inc., and Excel Telecommunications, Inc. (collectively "Excel"), holding U.S. Patent No. 5,333,184 (the '184 patent) invalid under § 101 for failure to claim statutory subject matter. *See AT&T Corp. v. Excel Communications, Inc.*, No. CIV.A.96-434-SLR, 1998 WL 175878, at *7 (D. Del. Mar. 27, 1998). AT&T Corp. ("AT&T"), owner of the '184 patent, appeals. Because we find that the claimed subject matter is properly within the statutory scope of § 101, we reverse the district court's judgment of invalidity on this ground and remand the case for further proceedings.

## BACKGROUND

### A.

The '184 patent, entitled "Call Message Recording for Telephone Systems," issued on July 26, 1994. It describes a message record for long-distance telephone calls that is enhanced by adding a primary interexchange carrier ("PIC") indicator. The addition of the indicator aids long-distance carriers in providing differential billing treatment for subscribers, depending upon whether a subscriber calls someone with the same or a different long-distance carrier.

The invention claimed in the '184 patent is designed to operate in a telecommunications system with multiple long-distance service providers. The system contains local exchange carriers ("LECs") and long-distance service (interexchange) carriers ("IXCs"). The LECs provide local telephone service and access to IXCs. Each customer has an LEC for local service and selects an IXC, such as AT&T or Excel, to be its primary long-distance service



(interexchange) carrier or PIC. IXCs may own their own facilities, as does AT&T. Others, like Excel, called "resellers" or "resale carriers," contact with facility-owners to route their subscribers' calls through the facility-owners' switches and transmission lines. Some IXCs, including MCI and U.S. Sprint, have a mix of their own lines and leased lines.

The system thus involves a three-step process when a caller makes a direct-dialed (1+) long-distance telephone call: (1) after the call is transmitted over the LEC's network to a switch, and the LEC identifies the caller's PIC, the LEC automatically routes the call to the facilities used by the caller's PIC; (2) the PIC's facilities carry the call to the LEC serving the call recipient; and (3) the call recipient's LEC delivers the call over its local network to the recipient's telephone.

When a caller makes a direct-dialed long-distance telephone call, a switch (which may be a switch in the interexchange network) monitors and records data related to the call, generating an "automatic message account" ("AMA") message record. This contemporaneous message record contains fields of information such as the originating and terminating telephone numbers, and the length of time of the call. These message records are then transmitted from the switch to a message accumulation system for processing and billing.

Because the message records are stored in electronic format, they can be transmitted from one computer system to another and reformatted to ease processing of the information. Thus the carrier's AMA message subsequently is translated into the industry-standard "exchange message interface," forwarded to a rating system, and ultimately forwarded to a billing system in which the data resides until processed to generate, typically, "hard copy" bills which are mailed to subscribers.

B.

The invention of the '184 patent calls for the addition of a data field into a standard message record to indicate whether a call involves a particular PIC (the "PIC indicator"). This PIC indicator can exist in several forms, such as a code which identifies the call recipient's PIC, a flag which shows that the recipient's PIC is or is not a particular IXC, or a flag that identifies the recipient's and the caller's PICs as the same IXC. The PIC indicator therefore enables IXCs to provide differential billing for calls on the basis of the identified PIC.

The application that issued as the '184 patent was filed in 1992. The U.S. Patent and Trademark Office ("PTO") initially rejected, for reasons unrelated to § 101, all forty-one of the originally filed claims. Following amendment, the claims were issued in 1994 in their present form. The '184 patent contains six independent claims, five method claims and one apparatus claim, and additional dependent claims. The PTO granted the '184 patent without questioning whether the claims were directed to statutory subject matter under § 101.

AT&T in 1996 asserted ten of the method claims against Excel in this infringement suit. The independent claims at issue (claims 1, 12, 18, and 40) include the step of "generating a message record for an interexchange call between an originating subscriber and a terminating subscriber," and the step of adding a PIC indicator to the message record. Independent claim 1, for example, adds a PIC indicator whose value depends upon the call recipient's PIC:

> 1. A method for use in a telecommunications system in which interexchange calls initiated by each subscriber are automatically routed over the facilities of a particular one of a plurality of



> interexchange carriers associated with that subscriber, said method comprising the steps of:
>
> *generating a message record for an interexchange call* between an originating subscriber and a terminating subscriber, and
>
> *including, in said message record, a primary interexchange carrier (PIC) indicator* having a value which is *a function of whether or not the interexchange carrier associated with said terminating subscriber is a predetermined one* of said interexchange carriers.

(Emphasis added.) Independent claims 12 and 40 add a PIC indicator that shows if a recipient's PIC is the same as the IXC over which that particular call is being made. Independent claim 18 adds a PIC indicator designed to show if the caller and the recipient subscribe to the same IXC. The dependent claims at issue add the steps of accessing an IXC's subscriber database (claims 4, 13, and 19) and billing individual calls as a function of the value of the PIC indicator (claims 6, 15, and 21).

The district court concluded that the method claims of the '184 patent implicitly recite a mathematical algorithm. *See AT&T*, 1998 WL 175878, at *6. The court was of the view that the only physical step in the claims involves data-gathering for the algorithm. *See id.* Though the court recognized that the claims require the use of switches and computers, it nevertheless concluded that use of such facilities to perform a non-substantive change in the data's format could not serve to convert non-patentable subject matter into patentable subject matter. *See id.* at *6-7. Thus the trial court, on summary judgment, held all of the method claims at issue invalid for

failure to qualify as statutory subject matter. *See id.* at *7.

## DISCUSSION

### A.

Summary judgment is appropriate if there are no genuine issues of material fact and the moving party is entitled to judgment as a matter of law. *See* Fed. R. Civ. P. 56(c). We review without deference a trial court's grant of summary judgment, with all justifiable factual inferences drawn in favor of the party opposing the motion. *See Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 255 (1986).

The issue on appeal, whether the asserted claims of the '184 patent are invalid for failure to claim statutory subject matter under 35 U.S.C. § 101, is a question of law which we review without deference. *See Arrhythmia Research Tech. v. Corazonix Corp.*, 958 F.2d 1053, 1055-56, 22 USPQ2d 1033, 1035 (Fed. Cir. 1992). In matters of statutory interpretation, it is this court's responsibility independently to determine what the law is. *See Hodges v. Secretary of the Dep't of Health & Human Servs.*, 9 F.3d 958, 960 (Fed. Cir. 1993).

### B.

Our analysis of whether a claim is directed to statutory subject matter begins with the language of 35 U.S.C. § 101, which reads:

> Whoever invents or discovers any new and useful process machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.



The Supreme Court has construed § 101 broadly, noting that Congress intended statutory subject matter to "include anything under the sun that is made by man." *See Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980) (quoting S. Rep. No. 82-1979, at 5 (1952); H.R. Rep. No. 82-1923, at 6 (1952)); *see also Diamond v. Diehr*, 450 U.S. 175, 182 (1981). Despite this seemingly limitless expanse, the Court has specifically identified three categories of unpatentable subject matter: "laws of nature, natural phenomena, and abstract ideas." *See Diehr*, 450 U.S. at 185.

In this case, the method claims at issue fall within the "process" [1] category of the four enumerated categories of patentable subject matter in § 101. The district court held that the claims at issue, though otherwise within the terms of § 101, implicitly recite a mathematical algorithm, *see AT&T*, 1998 WL 175878, at *6, and thus fall within the judicially created "mathematical algorithm" exception to statutory subject matter.

A mathematical formula alone, sometimes referred to as a mathematical algorithm, viewed in the abstract, is considered unpatentable subject matter. *See Diamond v. Diehr*, 450 U.S. 175 (1981); *Parker v. Flook*, 437 U.S. 584 (1978); *Gottschalk v. Benson*, 409 U.S. 63 (1972). Courts have used the terms "mathematical algorithm," "mathematical formula," and "mathematical equation," to describe types of nonstatutory mathematical subject matter without explaining whether the terms are interchangeable or different. Even assuming the words connote the same concept, there is considerable question as to exactly what the concept encompasses. *See, e.g., Diehr*, 450 U.S. at 186 n.9 ("The term 'algorithm' is subject to a variety

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[1] "Process" is defined in 35 U.S.C. § 100(b) to encompass: "[a] process, art or method, and includes a new use of a known process, machine, manufacture, composition of matter, or material."

of definitions . . . [Petitioner's] definition is significantly broader than the definition this Court employed in *Benson* and *Flook*."); *accord In re Schrader*, 22 F.3d 290, 293 n.5, 30 USPQ2d 1455, 1457 n.5 (Fed. Cir. 1994).

This court recently pointed out that any step-by-step process, be it electronic, chemical, or mechanical, involves an "algorithm" in the broad sense of the term. *See State Street Bank & Trust Co. v. Signature Fin. Group, Inc.*, 149 F.3d 1368, 1374-75, 47 USPQ2d 1596, 1602 (Fed. Cir. 1998), *cert. denied*, —— U.S. ——, 119 S. Ct. 851 (1999). Because § 101 includes processes as a category of patentable subject matter, the judicially-defined proscription against patenting of a "mathematical algorithm," to the extent such a proscription still exists, is narrowly limited to mathematical algorithms in the abstract. *See id.; see also Benson*, 409 U.S. at 65 (describing a mathematical algorithm as a "procedure for solving a given type of mathematical problem").

Since the process of manipulation of numbers is a fundamental part of computer technology, we have had to reexamine the rules that govern the patentability of such technology. The sea-changes in both law and technology stand as a testament to the ability of law to adapt to new and innovative concepts, while remaining true to basic principles. In an earlier era, the PTO published guidelines essentially rejecting the notion that computer programs were patentable.[2] As the technology progressed, our predecessor court disagreed, and, overturning some of the earlier limiting principles regarding § 101, announced more expansive principles formulated with computer technology in mind.[3] In our recent decision in *State*

[2] *See, e.g.*, 33 Fed. Reg. 15581, 15609-10 (1968).

[3] *See In re Taczy-Hornoch*, 397 F.2d 856, 158 USPQ 141 (CCPA 1968) (overruling the "function of a machine" doctrine); *see also*



*Street*, this court discarded the so-called "business method" exception and reassessed the "mathematical algorithm" exception, *see* 149 F.3d at 1373-77, 47 USPQ2d at 1600-04, both judicially-created "exceptions" to the statutory categories of § 101. As this brief review suggests, this court (and its predecessor) has struggled to make our understanding of the scope of § 101 responsive to the needs of the modern world.

The Supreme Court has supported and enhanced this effort. In *Diehr*, the Court expressly limited its two earlier decisions in *Flook* and *Benson* by emphasizing that these cases did no more than confirm the "long-established principle" that laws of nature, natural phenomena, and abstract ideas are excluded from patent protection. 450 U.S. at 185. The *Diehr* Court explicitly distinguished Diehr's process by pointing out that "the respondents here do not seek to patent a mathematical formula. Instead, they seek patent protection for a process of curing synthetic rubber." *Id.* at 187. The Court then explained that although the process used a well-known mathematical equation, the applicants did not "pre-empt the use of that equation." *Id.* Thus, even though a mathematical algorithm is not patentable in isolation, a process that applies an equation to a new and useful end "is at the very least not barred at the threshold by § 101." *Id.* at 188. In this regard, it is particularly worthy of note that the argument for the opposite result, that "the term 'algorithm' . . . is synonymous with the term 'computer program,'" *id.* at 219 (Stevens, J., dissenting), and thus computer-

*In re Bernhart*, 417 F.2d 1395, 163 USPQ 611 (CCPA 1969) (discussing patentability of a programmed computer); *In re Musgrave*, 431 F.2d 882, 167 USPQ 280 (CCPA 1970) (analyzing process claims encompassing computer programs). For a more detailed review of this history, with extensive citation to the secondary literature, see Justice Stevens's dissent in *Diehr*, 450 U.S. at 193.

based programs as a general proposition should not be patentable, was made forcefully in dissent by Justice Stevens; his view, however, was rejected by the *Diehr* majority.

As previously noted, we most recently addressed the "mathematical algorithm" exception in *State Street*. *See* 149 F.3d at 1373-75, 47 USPQ2d at 1600-02. In *State Street*, this court, following the Supreme Court's guidance in *Diehr*, concluded that "[u]npatentable mathematical algorithms are identifiable by showing they are merely abstract ideas constituting disembodied concepts of truths that are not 'useful.' . . . [T]o be patentable an algorithm must be applied in a 'useful' way." *Id.* at 1373, 47 USPQ2d at 1601. In that case, the claimed data processing system for implementing a financial management structure satisfied the § 101 inquiry because it constituted a "practical application of a mathematical algorithm, . . . [by] produc[ing] 'a useful, concrete and tangible result.'" *Id.* at 1373, 47 USPQ2d at 1601.

The *State Street* formulation, that a mathematical algorithm may be an integral part of patentable subject matter such as a machine or process if the claimed invention as a whole is applied in a "useful" manner, follows the approach taken by this court en banc in *In re Alappat*, 33 F.3d 1526, 31 USPQ2d 1545 (Fed. Cir. 1994). In *Alappat*, we set out our understanding of the Supreme Court's limitations on the patentability of mathematical subject matter and concluded that:

> [The Court] never intended to create an overly broad, fourth category of [mathematical] subject matter excluded from § 101. Rather, at the core of the Court's analysis . . . lies an attempt by the Court to explain a rather straightforward concept, namely, that certain types of mathematical subject matter,



> *standing alone*, represent nothing more than *abstract ideas until reduced to some type of practical application*, and thus that subject matter is not, in and of itself, entitled to patent protection.

*Id.* at 1543, 31 USPQ2d at 1556-57 (emphasis added). Thus, the *Alappat* inquiry simply requires an examination of the contested claims to see if the claimed subject matter as a whole is a disembodied mathematical concept representing nothing more than a "law of nature" or an "abstract idea," or if the mathematical concept has been reduced to some practical application rendering it "useful." *Id.* at 1544, 31 USPQ2d at 1557. In *Alappat*, we held that more than an abstract idea was claimed because the claimed invention as a whole was directed toward forming a specific machine that produced the useful, concrete, and tangible result of a smooth waveform display. *See id.* at 1544, 31 USPQ2d at 1557.

In both *Alappat* and *State Street*, the claim was for a machine that achieved certain results. In the case before us, because Excel does not own or operate the facilities over which its calls are placed, AT&T did not charge Excel with infringement of its apparatus claims, but limited its infringement charge to the specified method or process claims. Whether stated implicitly or explicitly, we consider the scope of § 101 to be the same regardless of the form—machine or process—in which a particular claim is drafted. *See, e.g., In re Alappat*, 33 F.3d at 1581, 31 USPQ2d at 1589 Rader, J., concurring) ("Judge Rich, with whom I fully concur, reads Alappat's application as claiming a machine. In fact, whether the invention is a process or a machine is irrelevant. The language of the Patent Act itself, as well as Supreme Court rulings, clarifies that Alappat's invention fits comfortably within 35 U.S.C. § 101 whether viewed as a process or a ma-

chine."); *State Street*, 149 F.3d at 1372, 47 USPQ2d at 1600 ("[F]or the purposes of a § 101 analysis, it is of little relevance whether claim 1 is directed to a 'machine' or a 'process,' . . . ."). Furthermore, the Supreme Court's decisions in *Diehr*, *Benson*, and *Flook*, all of which involved method (i.e., process) claims, have provided and supported the principles which we apply to both machine- and process-type claims. Thus, we are comfortable in applying our reasoning in *Alappat* and *State Street* to the method claims at issue in this case.

C.

In light of this review of the current understanding of the "mathematical algorithm" exception, we turn now to the arguments of the parties in support of and in opposition to the trial court's judgment. We note that, at the time the trial court made its decision, that court did not have the benefit of this court's explication in *State Street* of the mathematical algorithm issue.

As previously explained, AT&T's claimed process employs subscribers' and call recipients' PICs as data, applies Boolean algebra to those data to determine the value of the PIC indicator, and applies that value through switching and recording mechanisms to create a signal useful for billing purposes. In *State Street*, we held that the processing system there was patentable subject matter because the system takes data representing discrete dollar amounts through a series of mathematical calculations to determine a final share price—a useful, concrete, and tangible result. *See* 149 F.3d at 1373, 47 USPQ2d at 1601.

In this case, Excel argues, correctly, that the PIC indicator value is derived using a simple mathematical principle (p and q). But that is not determinative because



AT&T does not claim the Boolean principle as such or attempt to forestall its use in any other application. It is clear from the written description of the '184 patent that AT&T is only claiming a process that uses the Boolean principle in order to determine the value of the PIC indicator. The PIC indicator represents information about the call recipient's PIC, a useful, non-abstract result that facilitates differential billing of long-distance calls made by an IXC's subscriber. Because the claimed process applies the Boolean principle to produce a useful, concrete, tangible result without pre-empting other uses of the mathematical principle, on its face the claimed process comfortably falls within the scope of § 101. *See Arrhythmia Research Tech. Inc. v. Corazonix Corp.*, 958 F.2d 1053, 1060, 22 USPQ2d 1033, 1039 (Fed. Cir. 1992) ("That the product is numerical is not a criterion of whether the claim is directed to statutory subject matter.").

Excel argues that method claims containing mathematical algorithms are patentable subject matter only if there is a "physical transformation" or conversion of subject matter from one state into another. The physical transformation language appears in *Diehr*, *see* 450 U.S. at 184 ("That respondents' claims involve the transformation of an article, in this case raw, uncured synthetic rubber, into a different state or thing cannot be disputed."), and has been echoed by this court in *Schrader*, 22 F.3d at 294, 30 USPQ2d at 1458 ("Therefore, we do not find in the claim any kind of data transformation.").

The notion of "physical transformation" can be misunderstood. In the first place, it is not an invariable requirement, but merely one example of how a mathematical algorithm may bring about a useful application. As the Supreme Court itself noted, "when [a claimed invention] is performing a function which the patent laws were

designed to protect (e.g., transforming or reducing an article to a different state or thing), then the claim satisfies the requirements of § 101." *Diehr*, 450 U.S. at 192 (emphasis added). The "e.g." signal denotes an example, not an exclusive requirement.

This understanding of transformation is consistent with our earlier decision in *Arrhythmia*, 958 F.2d 1053, 22 USPQ2d 1033 (Fed. Cir. 1992). Arrhythmia's process claims included various mathematical formulae to analyze electrocardiograph signals to determine a specified heart activity. *See id.* at 1059, 22 USPQ2d at 1037-38. The *Arrhythmia* court reasoned that the method claims qualified as statutory subject matter by noting that the steps transformed physical, electrical signals from one form into another form—a number representing a signal related to the patient's heart activity, a non-abstract output. *See id.*, 22 USPQ2d at 1038. The finding that the claimed process "transformed" data from one "form" to another simply confirmed that Arrhythmia's method claims satisfied § 101 because the mathematical algorithm included within the process was applied to produce a number which had specific meaning—a useful, concrete, tangible result—not a mathematical abstraction. *See id.* at 1060, 22 USPQ2d at 1039.

Excel also contends that because the process claims at issue lack physical limitations set forth in the patent, the claims are not patentable subject matter. This argument reflects a misunderstanding of our case law. The cases cited by Excel for this proposition involved machine claims written in means-plus-function language. *See, e.g., State Street*, 149 F.3d at 1371, 47 USPQ2d at 1599; *Alappat*, 33 F.3d at 1541, 31 USPQ2d at 1554-55. Apparatus claims written in this manner require supporting structure in the written description that corresponds to the claimed "means" elements. *See* 35 U.S.C. § 112,



para. 6 (1994). Since the claims at issue in this case are directed to a process in the first instance, a structural inquiry is unnecessary.

The argument that physical limitations are necessary may also stem from the second part of the *Freeman-Walter-Abele* test,[4] an earlier test which has been used to identify claims thought to involve unpatentable mathematical algorithms. That second part was said to inquire "whether the claim is directed to a mathematical algorithm that is not applied to or limited by physical elements." *Arrhythmia*, 958 F.2d at 1058, 22 USPQ2d at 1037. Although our en banc *Alappat* decision called this test "not an improper analysis," we then pointed out that "the ultimate issue always has been whether the claim as a whole is drawn to statutory subject matter." 33 F.3d at 1543 n.21, 31 USPQ2d at 1557 n.21. Furthermore, our recent *State Street* decision questioned the continuing viability of the *Freeman-Walter-Abele* test, noting that, "[a]fter *Diehr* and *Chakrabarty*, the *Freeman-Walter-Abele* test has little, if any, applicability to determining the presence of statutory subject matter." 149 F.3d at 1374, 47 USPQ2d at 1601. Whatever may be left of the earlier test, if anything, this type of physical limitations analysis seems of little value because "after *Diehr* and *Alappat*, the mere fact that a claimed invention involves inputting numbers, calculating numbers, outputting numbers, and storing numbers, in and of itself, would not render it nonstatutory subject matter, unless, of course, its operation does not produce a 'useful, concrete and tangible result.'" *Id.* at 1374, 47 USPQ2d at 1602 (quoting *Alappat*, 33 F.3d at 1544, 31 USPQ2d at 1557).

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[4] See *In re Freeman*, 573 F.2d 1237, 197 USPQ 464 (CCPA 1978), as modified by *In re Walter*, 618 F.2d 758, 205 USPQ 397 (CCPA 1980), and *In re Abele*, 648 F.2d 902, 214 USPQ 682 (CCPA 1982).

Because we focus on the inquiry deemed "the ultimate issue" by *Alappat*, rather than on the physical limitations inquiry of the *Freeman-Walter-Abele* test, we find the cases cited by Excel in support of its position to be inapposite. For example, in *In re Grams*, the court applied the *Freeman-Walter-Abele* test and concluded that the only physical step in the claimed process involved data-gathering for the algorithm; thus, the claims were held to be directed to unpatentable subject matter. *See* 888 F.2d 835, 839, 12 USPQ2d 1824, 1829 (Fed. Cir. 1989). In contrast, our inquiry here focuses on whether the mathematical algorithm is applied in a practical manner to produce a useful result. *In re Grams* is unhelpful because the panel in that case did not ascertain if the end result of the claimed process was useful, concrete, and tangible.

Similarly, the court in *In re Schrader* relied upon the *Freeman-Walter-Abele* test for its analysis of the method claim involved. The court found neither a physical transformation nor any physical step in the claimed process aside from the entering of data into a record. *See* 22 F.3d at 294, 30 USPQ2d at 1458. The *Schrader* court likened the data-recording step to that of data-gathering and held that the claim was properly rejected as failing to define patentable subject matter. *See id.* at 294, 296, 30 USPQ2d at 1458-59. The focus of the court in *Schrader* was not on whether the mathematical algorithm was applied in a practical manner since it ended its inquiry before looking to see if a useful, concrete, tangible result ensued. Thus, in light of our recent understanding of the issue, the *Schrader* court's analysis is as unhelpful as that of *In re Grams*.

Finally, the decision in *In re Warmerdam*, 33 F.3d 1354, 31 USPQ2d 1754 (Fed. Cir. 1994) is not to the contrary. There the court recognized the difficulty in



knowing exactly what a mathematical algorithm is, "which makes rather dicey the determination of whether the claim as a whole is no more than that." *Id.* at 1359, 31 USPQ2d at 1758. Warmerdam's claims 1-4 encompassed a method for controlling the motion of objects and machines to avoid collision with other moving or fixed objects by generating bubble hierarchies through the use of a particular mathematical procedure. *See id.* at 1356, 31 USPQ2d at 1755-56. The court found that the claimed process did nothing more than manipulate basic mathematical constructs and concluded that "taking several abstract ideas and manipulating them together adds nothing to the basic equation"; hence, the court held that the claims were properly rejected under § 101. *Id.* at 1360, 31 USPQ2d at 1759. Whether one agrees with the court's conclusion on the facts, the holding of the case is a straightforward application of the basic principle that mere laws of nature, natural phenomena, and abstract ideas are not within the categories of inventions or discoveries that may be patented under § 101.

D.

In his dissent in *Diehr*, Justice Stevens noted two concerns regarding the § 101 issue, and to which, in his view, federal judges have a duty to respond:

> First, the cases considering the patentability of program-related inventions do not establish rules that enable a conscientious patent lawyer to determine with a fair degree of accuracy which, if any, program-related inventions will be patentable. Second, the inclusion of the ambiguous concept of an "algorithm" within the "law of nature" category of unpatentable subject matter has given rise to the concern that almost any process might be so described and therefore held unpatentable.

*Diehr*, 450 U.S. at 219 (Stevens, J., dissenting).

Despite the almost twenty years since Justice Stevens wrote, these concerns remain important. His solution was to declare all computer-based programming unpatentable. That has not been the course the law has taken. Rather, it is now clear that computer-based programming constitutes patentable subject matter so long as the basic requirements of § 101 are met. Justice Stevens's concerns can be addressed within that framework.

His first concern, that the rules are not sufficiently clear to enable reasonable prediction of outcomes, should be less of a concern today in light of the refocusing of the § 101 issue that *Alappat* and *State Street* have provided. His second concern, that the ambiguous concept of "algorithm" could be used to make any process unpatentable, can be laid to rest once the focus is understood to be not on whether there is a mathematical algorithm at work, but on whether the algorithm-containing invention, as a whole, produces a tangible, useful, result.

In light of the above, and consistent with the clearer understanding that our more recent cases have provided, we conclude that the district court did not apply the proper analysis to the method claims at issue. Furthermore, had the court applied the proper analysis to the stated claims, the court would have concluded that all the claims asserted fall comfortably within the broad scope of patentable subject matter under § 101. Accordingly, we hold as a matter of law that Excel was not entitled to the grant of summary judgment of invalidity of the '184 patent under § 101.

Since the case must be returned to the trial court for further proceedings, and to avoid any possible misunderstandings as to the scope of our decision, we note that the ultimate validity of these claims depends upon their satisfying the other requirements for patentability such as



those set forth in 35 U.S.C. §§ 102, 103, and 112. Thus, on remand, those questions, as well as any others the parties may properly raise, remain for disposition.

## CONCLUSION

The district court's summary judgment of invalidity is reversed, and the case is remanded for further proceedings consistent with this opinion.

*REVERSED & REMANDED.*

APPENDIX B

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

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Civil Action. No. 96-434-SLR

AT&T CORP.,

*Plaintiff*,

v.

EXCEL COMMUNICATIONS, INC.;
EXCEL COMMUNICATIONS MARKETING, INC.;
and EXCEL TELECOMMUNICATIONS, INC.,

*Defendants*.

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Dated: March 27, 1998
Wilmington, Delaware

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MEMORANDUM OPINION

ROBINSON, District Judge

I. INTRODUCTION

Plaintiff AT&T Corp. ("AT&T") instituted suit against defendants Excel Communications, Inc., Excel Communications Marketing, Inc., and Excel Telecommunications, Inc. (collectively referred to as "Excel") alleging that Excel has infringed U.S. Patent No. 5,333,184 ("'184 patent"). This court has subject matter jurisdiction pursuant to 28 U.S.C. § 1338.



Pending before the court is Excel's motion for summary judgment based on Excel's contention that the '184 patent does not meet the requirements of 35 U.S.C. § 101. (D.I. 182) The motion has been fully briefed and argued. For the reasons that follow, the motion shall be granted.

II. BACKGROUND INFORMATION

As recently as 15 years ago, AT&T was the primary provider of telephone services in the United States. Consistent with the final order entered in *United States v. AT&T*, 552 F. Supp. 131 (D.D.C. 1982), *aff'd sub nom, Maryland v. U.S.*, 460 U.S. 1001 (1983), AT&T agreed to divest itself of its local telephone companies, in exchange for retaining its long distance and equipment manufacturing businesses. Consequently, local phone companies (local exchange carriers or "LECs") have been required to offer to all interexchange carriers ("IXCs")[1] access to the local exchange network that is "equal in

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[1] LECs are the telephone companies that provide the physical connection between a subscriber's telephone and the local switching office. These companies provide local telephone service and connect customers to IXC's for handling long-distance calls.

IXCs are either "facilities-based," or "resellers." *See In the Matter of WATS Int'l Corp. v. Group Long Distance (USA), Inc.*, 12 F.C.C.R. 1743, 1744 n.5 (1997). A facilities-based IXC is a carrier that provides telecommunications services from facilities (i.e., switches and transmission lines) which they own, operate, lease or otherwise control. AT&T is a facilities-based IXC.

Excel is a "reseller." Excel does not own, operate, lease, or otherwise control facilities for carrying the interexchange calls of its customers but does provide billing and other customer services. Resellers such as Excel are regulated as common carriers by the FCC even though they do not actually carry the long-distance calls of their customers. *See AT&T v. FCC*, 572 F.2d 17, 24 (2d Cir. 1978) ("A common carrier is one which undertakes indifferently to provide communications service to the public for hire, regardless of the actual ownership or operation of the facilities involved.").

type, quality, and price" to that offered to AT&T and its affiliates. The "equal access" directive not only required that IXCs would receive equal transmission quality, but also that callers would have the opportunity to presubscribe their telephones to an IXC other than AT&T.[2]

By September 1986, LECs were required to develop a mechanism for local phone customers to choose IXCs other than AT&T to be their "primary interexchange carrier" ("PIC"); that is, the carrier that would provide long-distance service for calls dialed from the customers' telephone.[3] Implementation of such "equal access" ensured that when a subscribed made a 1+ long-distance call, the subscriber's LEC would, with some geographic exceptions, direct the call to the network of the subscriber's PIC.

## III. THE '184 PATENT

The '184 patent generally "relates to arrangements used in telephone networks for recording messages used to bill charges for interexchange calls." (Col. 1, lns 6-8) The invention is "more particularly" described as relating "to the generation of message records for long-distance—

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[2] Before the advent of "equal access," all interstate long-distance calls dialed on a 1+ basis were routed by the LEC to AT&T. A caller could reach another IXC only by dialing a seven-digit phone number, as well as a lengthy identification code, prior to dialing the called number. "Equal access" enabled callers to select a carrier other than AT&T to provide them long-distance phone service on a simple "1+" dialing basis. The end user has the additional capability of using other IXCs by "dialing around" the selected IXC. An end user "dials around" a presubscribed carrier by dialing an access code prefix (e.g., 1-800-CALL ATT to reach AT&T or 10333 to reach Sprint) in order to use the long-distance carrier the end user prefers for that call.

[3] *See U.S. v. Western Elec. Co.*, 578 F. Supp. 668, 670 (D.D.C. 1983).



or so-called interexchange—calls, which involve the use of the facilities of a long-distance, or interexchange, carrier, also referred to as an IXC." (Col. 1, lns 30-34) The real-world context for the invention is generally described in the specification as follows:

> Each subscriber to a local telephone service from a local exchange carrier, or LEC . . ., has an associated "primary interexchange carrier," or PIC, that was selected by or for the local subscriber. . . . When a long-distance call is initiated by the subscriber, the call is routed through the network of the originating subscriber's LEC, over the network of the PIC and, ultimately, through the network of the LEC which has as one of its subscribers the called party. At the termination of the call, a switch which carried the call—illustratively a switch in the interexchange carrier's network—generates the AMA [automatic message account]. . . .
>
> (Col. 1, lns 35-49)
>
> In a typical system, the message records . . . are transmitted from an originating switch to a message accumulation system. The latter distributes the accumulated messages to appropriate further processing systems which translate the AMA message records into the industry-standard "exchange message interface," or EMI, message record format. The EMI records are thereupon forwarded to a rating system which, *inter alia*, computes the toll charges applicable to the calls and adds an indication of those charges to the EMI record. The records thus formed are forwarded to a billing system in which they reside until processed to generate, typically, "hard copy" bills which are mailed to subscribers.
>
> (Col. 1, lns 14-29)

The '184 patent specifically involves the addition of "a further piece of data"—the PIC indicator—to the typical message record fields[4] by the rating systems. "Each rating system, in order to generate the PIC indicator, needs to be able to access a comprehensive database in which all [of a certain IXC's] subscriber telephone numbers are stored." (Col. 5, lns 33-36) As noted, the generation of the PIC indicator in the embodiment described in the specification occurs in the rating system:

> In particular, it is first determined at step 506 whether the originating subscriber is PIC'd to IXC 30. If not, there is no need to continue further inasmuch as PIC indicator 3410 will necessarily be in the "not set" state, as shown in FIG. 3. On the other hand, if the originating subscriber is PIC'd to IXC 30, then it is determined at step 508 whether the terminating subscriber is PIC's to IXC 30. If the terminating subscriber is not PIC's to IXC 30, then, again, PIC indicator 3419 will be left in the "not set" state. If, however, the terminating subscriber is PIC's to IXC 30, then PIC indictaor 3419 will be put in the "set" state, as indicated at step 511. After perhaps performing various other functions not relevant here, rating system 331 transfers, or transmits, the now rated and PIC-evaluated EMI message to a billing system for subsequent processing.

(Col. 5, lns 45-61)

> The value of PIC indicator 3419 . . . is an indication as to whether the PIC of the terminating subscriber of the call in question is IXC 30. In various

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4 The "[t]ypical message record fields are the originating and terminating telephone numbers and elapsed time of call." (Col. 1, lns 12-14)



> embodiments, this indication may take the form of a code which actually identifies the terminating subscriber's PIC. Or the PIC indicator may simply be in the form of a flag, or indicator, which indicates, at a minimum, whether or not the terminating subscriber's PIC is IXC 30. In the present illustrative embodiment, however, PIC indicator 3419 is even more explicit than that. In particular, its value indicates whether or not both the terminating and originating subscribers' PIC is IXC 30.

(Col. 4, lns 11-22)

In summary then, the crux of the invention is to include a "PIC indicator" on the standard EMI message record. As explained above, a "PIC" is the "primary interexchange carrier" selected by or for a local subscriber; when said subscriber initiates a long-distance call, that call will be routed over the network of that subscriber's PIC by the LEC absent some further intervention by the subscriber. (Col. 1, lns 35-45) A "PIC indicator" is some indication of whether the terminating subscriber's PIC is the same as the originating subscriber's PIC, information which traditionally has not been relevant to the question of whether and to what extent the originating subscriber should be charged for a long-distance call. In accordance with the '184 patent, the "PIC indicator"

> may be used by an interexchange carrier when bills are rendered for its subscribers—for example, to provide different billing treatment for calls that were made over that carrier's network to terminating subscribers whose PIC is, in fact, that very carrier, as opposed to calls that were made to subscribers with a different PIC.

(Col. 1, ln 67-Col. 2, ln 5)

The four independent claims asserted by AT&T against Excel read as follows:

1. A method for use in a telecommunications system in which interexchange calls initiated by each subscriber are automatically routed over the facilities of a particular one of a plurality of interexchange carriers associated with that subscriber, said method comprising the steps of:

generating a message record for an interexchange call between an originating subscriber and a terminating subscriber, and

including, in said message record, a primary interexchange carrier (PIC) indicator having a value which is a function of whether or not the interexchange carrier associated with said terminating subscriber is a predetermined one of said interexchange carriers.

* * *

12. A method for use in a telecommunications system in which each subscriber has a primary interexchange carrier (PIC) over which interexchange calls initiated by that subscriber are carried, said method comprising the steps of:

generating a message record for each interexchange call between an originating subscriber and a terminating subscriber for which a charge is to be imposed, and

providing, in said message record, an indication which has a particular value when the particular interexchange carrier over which said call was carried is the PIC for said terminating subscriber.

* * *



18. A method for use in a telecommunications system in which each subscriber has a primary interexchange carrier (PIC) over which interexchange calls initiated by that subscriber are carried, said method comprising the steps of:

generating a message record for each interexchange call between an originating subscriber and a terminating subscriber for which a charge is to be imposed, and

providing, in said message record, an indication which has a particular value when the particular interexchange carrier over which said call was carried is the PIC for said terminating subscriber and is also the PIC for said originating subscriber.

* * *

40. A method for use in a telecommunications system in which interexchange calls initiated by each subscriber are automatically routed over the facilities of a particular one of a plurality of interexchange carriers associated with that subscriber, said method comprising the steps of:

generating a message record for an interexchange call between an originating subscriber and a terminating subscriber,

accessing a database in which are stored the telephone numbers of substantially all of the subscribers associated with the specific one of said interexchange carriers over which said call was routed to make determination as to whether or not the interexchange carrier associated with said terminating subscriber is said specific interexchange carrier over whose facilities said call was routed,

establishing an indicator for said call at a particular value when said determination is that the inter-

exchange carrier associated with said terminating subscriber is said specific interexchange carrier over whose facilities said call was routed, and

providing an output which is a function of both information in said message record and of said indicator.

(Col. 7, lns 2-16; Col. 8, lns 15-27 and 57-68; Col. 9, lns 1-2; Col. 12, lns 1-24)

## IV. STANDARD OF REVIEW

Summary judgment should be granted only if a court concludes that "there is no genuine issue as to any material fact and that the moving party is entitled to judgment as a matter of law." Fed.R.Civ.P. 56(c). The moving party bears the burden of proving that no genuine issue of material fact is in dispute. *See Matsushita Elec. Indus. Co., Ltd. v. Zenith Radio Corp.*, 475 U.S. 574, 586 n.10 (1986). Once the movant has carried its initial burden, "the nonmoving party must come forward with 'specific facts showing that there is a genuine issue for trial.'" *Id.* at 587 (citation omitted). "Facts that could alter the outcome are 'material,' and disputes are 'genuine' if evidence exists from which a rational person could conclude that the position of the person with the burden of proof on the disputed issue is correct." *Horowitz v. Federal Kemper Life Assurance Co.*, 57 F.3d 300, 302 n.1 (3d Cir. 1995) (citations omitted). This court must "view the underlying facts and all reasonable inferences therefrom in the light most favorable to the party opposing the motion." *Pennsylvania Coal Ass'n v. Babbitt*, 63 F.3d 231, 236 (3d Cir. 1995) (citation omitted).

There are no disputed facts material to the issue at bar. Moreover, the question of whether the claims asserted by AT&T are directed to statutory subject matter, as defined



in 35 U.S.C. § 101, is one of law. *See Arrhythmia Research Technology, Inc. v. Corazonix Corp.*, 958 F.2d 1053, 1055 (Fed. Cir. 1992). Therefore, summary judgment is an appropriate mechanism to resolve the § 101 challenge, keeping in mind the statutory presumption of validity in a patent case. *See id.*

## V. ANALYSIS

Patentable subject matter is defined in 35 U.S.C. § 101 as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

As an initial matter, the Supreme Court has observed "that Congress intended statutory subject matter to 'include anything under the sun that is made by man.'" *Diamond v. Diehr*, 450 U.S. 175, 182 (1981) (citation omitted). Thus, "[e]xcluded from such patent protection are laws of nature, natural phenomena, and abstract ideas." *Id.* at 183. Examples of the latter have been described in *Gottschalk v. Benson*, 409 U.S. 63 (1972) and *Parker v. Flook*, 437 U.S. 584 (1978). In *Gottschalk*, the Supreme Court held unpatentable claims for an algorithm (or mathematical formula) used in connection with the programming of a general purpose digital computer. The algorithm at issue converted binary code decimal numbers to equivalent pure binary numbers; the Court concluded that such an algorithm was like a law of nature. Similarly, in *Parker*, the Supreme Court concluded that claims were unpatentable when they did no more than provide a formula for computing a number (in this case, an "alarm limit"), without explaining how the several variables identified in the formula were to be determined and

without any disclosure relating to the chemical processes at work.

The Supreme Court has cautioned in this regard, however, "that a claim drawn to subject matter otherwise statutory does not become nonstatutory simply because it uses a mathematical formula, computer program, or digital computer." *Diehr*, 450 U.S. at 186. Where, as here, process claims are at issue, "[t]ransformation and reduction of an article 'to a different state or thing' is the clue to . . . patentability. . . ." *Id.* at 183. In *Diehr*, the Court held patentable claims which described "in detail a step-by-step method" for transforming an article—raw, uncured synthetic rubber—into a different state or thing—cured precision products. The Court's conclusion was not altered by the fact that in several steps of the process a mathematical equation and a programmed digital computer were used.

The Federal Circuit, in decisions following *Diehr*, has found patentable "a method of analyzing electrocardiograph signals in order to determine a specified heart activity," *Arrhythmia Research Technology, Inc.*, 958 F.2d at 1058, as well as "a combination of interrelated elements which combine to form a machine for converting discrete waveform data samples into anti-aliased pixel illumination intensity data to be displayed on a display means," *In re Alappat*, 33 F.3d 1526, 1544 (Fed. Cir. 1994). Found to be unpatentable have been "a method of testing a complex system to determine whether the system condition is normal or abnormal and, if it is abnormal, to determine the cause of the abnormality," *In re Grams*, 888 F.2d 835, 836 (Fed. Cir. 1989); "a method for competitively bidding on a plurality of related items, such as contiguous tracts of land or the like," *In re Schrader*, 22 F.3d 290, 291 (Fed. Cir. 1994); and "methods for generating a 'data structure'" in order to



control the motion of objects and machines to avoid collision with other moving or fixed objects, *In re Warmerdam*, 33 F.3d 1354, 1355 (Fed. Cir. 1994).

Among its various attempts to articulate the test for § 101 patentability, the Federal Circuit in *In re Schrader* stated that "[t]he dispositive issue" in reviewing patentability under § 101 "is whether the claim as a whole recites sufficient physical activity to constitute patentable subject matter." 22 F.3d at 294 n.9 (citing *In re Grams*, 888 F.2d at 839). The Federal Circuit elsewhere has articulated the issue as being whether "the claimed subject matter as a whole is a disembodied mathematical concept, . . . which in essence represents nothing more than a 'law of nature,' 'natural phenomenon,' or 'abstract idea.'"[5] *In re Alappat*, 33 F.3d at 1544; *see, e.g., Arrhythmia Research Technology, Inc.*, 958 F.2d at 1059 ("The tresultant output is not an abstract number, but is a signal related to the patient's heart activity."). In addition, the Federal Circuit has looked to whether the mathematical formula or algorithm was "incorporated in a useful process," *Arrhythmia Research Technology, Inc.*, 958 F.2d at 1057 (commenting on the Supreme Court's ruling in *Diehr*). Consistent with the latter approach, Judge Newman wrote in her dissent in *In re Schrader*, 22 F.3d at 296:

> All mathematical algorithms transform data, and thus serve as a process to convert initial conditions or inputs into solutions or outputs, through transformation of information. Data representing bid prices for parcels of land do not differ, in section

[5] The Federal Circuit in *In re Alappat* defined an abstract idea as constituting "disembodied concepts or truths which are not 'useful' from a practical standpoint standing alone, i.e., they are not 'useful' until reduced to some practical application." 33 F.3. at 1543 n.18.

> 101 substance, from data representing electrocardiogram signals (*Arrhythmia*) or parameters in a process for curing rubber (*Diehr*). All of these processes are employed in technologically useful arts. Even were a mathematical formula viewed as "like a law of nature," . . . the requirements of section 101 are met when the formula is applied in a technological process to produce a useful result.

Despite AT&T's arguments to the contrary, the court finds that the claims at issue implicitly recite a mathematical algorithm. As defined in the '184 patent, the value of the PIC indicator "is a function of whether or not the interexchange carrier associated with [] the terminating subscriber is a predetermined one of said interchange carriers." (Col. 7, lns 13-16) (emphasis added). The fact that the PIC indicator may take the form of a code or a flag does not mandate a finding that the PIC indicator is not "calculated." An algorithm need not involve numbers; it need only specify "a conditional sequence of steps or operations for solving a class of problems." *In re Schrader*, 22 F.2d at 293 n.5..

The independent claims 1, 12, 18, and 40 of the '184 patent claim a method comprising the steps of "generating a message record" and "including, in said message record," a PIC indicator having a value. Although the first element of these claims, generating a message record, is not "new"[6] but a standard practice in the industry, the court is directed to look at the claims as a whole to determine whether the process claimed "is performing a function which the patent laws were designed to protect (e.g., transforming, or reducing an article to a different state or thing). . .. ." *Diehr*, 450 U.S. at 192.

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[6] Of course, novelty is the subject for a § 102 challenge, not a § 101 challenge.. *See Diehr*, 450 U.S. at 189-190.



In this regard, the '184 patent can be described as claiming an invention whereby certain information that is already known within a telecommunications system (the PICs of the originating and terminating subscribers) is simply retrieved for an allegedly new use in billing.[7] Characterized as such, the § 101 inquiry employed, e.g., in *In re Grams*, would dictate a finding of nonpatentability: Where "the only physical step [in the claim] involves merely gathering data for the alborithm," the subject matter is unpatentable. 888 F.2d at 839.

On the other hand, the '184 patent clearly involves the use of "facilities"—e.g., switches and computers—which presumably function (although nowhere in the '184 patent is their function specifically described) to transform analog signals into digital signals for ultimate use in a computerized billing system.[8] The question this scenario raises for the court is whether the routine conversion of data from an analog to a digital format is sufficient for § 101 purposes, when the substantive data remains the same.[9] In other words, which is more important in this § 101 inquiry, form or substance?

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[7] The court understands AT&T to argue in this litigation that the claims are not limited to billing purposes. However, the preferred, and it appears the only practical, embodiment of the claimed method is so directed and is appropriately considered in this § 101 inquiry. *Cf. In re Warmerdam*, 33 F.3d at 1360 and n.4.

[8] AT&T's argument in support of subject matter patentability is grounded primarily on its assertion that

> [t]he invention is not an abstract mathematical exercise or algorithm, but rather is a specific application of specifically tailored hardware and software in a specifically defined environment to accomplish a tangible result.

(D.I. 214 at 5; *see also* D.I. 271 at 40-46)

[9] Although the value of the PIC indicator may differ, depending on what information the IXC wants to know, the actual underlying data—the PICs of the originating and terminating subscribers—

The court concludes that substance has been and should be the focus of the § 101 inquiry.[10] Consequently, if the initial "condition or input" is substantively no different from the "solution or output," a change in the data's format should not serve to convert nonpatentable subject matter into patentable subject matter. Accordingly, the court holds that the claims at issue in the '184 patent are unpatentable under 35 U.S.C. § 101.

## VI. CONCLUSION

For the reasons stated, defendants' motion for summary judgment under 35 U.S.C. § 101 (D.I. 182) shall be granted.

An order will follow.

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are known variables which, for purposes of the '184 patent, do not change.

10 This conclusion finds support in the case law identified *supra*. For example, in both *In re Grams*, 888 F.2d at 837, and *In re Schrader*, 22 F.3d at 291, where the data input (test results and winning bids, respectively) was never changed, only compared and/or organized, the Federal Circuit found the subject matter of the proposed inventions nonpatentable. By contrast, in *Arrhythmia Research Technology, Inc.*, 958 F.2d at 1055, and *In re Alappat*, 33 F.3d at 1537, the data input was improved (i.e., changed substantively) through the use of the proposed inventions, "by eliminating certain perturbations that obscured" the inputted electrocardiographic signals (*Arrhythmia Research Technology, Inc.*, 958 F.2d at 1035.) or by "overcom[ing] effects" "known as aliasing" (*In re Alappat*, 33 F.3d at 1537.).



## APPENDIX C

## UNITED STATES DISTRICT COURT FOR THE DISTRICT OF DELAWARE

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Civil Action. No. 96-434-SLR

AT&T CORP.,

*Plaintiff*,

v.

EXCEL COMMUNICATIONS, INC.;
EXCEL COMMUNICATIONS MARKETING, INC.;
and EXCEL TELECOMMUNICATIONS, INC.,

*Defendants.*

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## ORDER

At Wilmington this 27th day of March, 1998, for the reasons stated in the memorandum opinion issued this same date;

IT IS ORDERED that the motion for summary judgment under 35 U.S.C. § 101 filed by defendants Excel Communications, Inc., Excel Communications Marketing, Inc., and Excel Telecommunications, Inc. (D.I. 182) is granted.

IT IS FURTHER ORDERED that the Clerk is directed to enter judgment in favor of defendants Excel Communications, Inc., Excel Communications Marketing, Inc., and Excel Telecommunications, Inc. and against plaintiff AT&T Corp.

/s/ Sue L. Robinson
United States District Judge

## APPENDIX D

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

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Civil Action No. 96-434 SLR

AT&T CORP.,

*Plaintiff,*

v.

EXCEL COMMUNICATIONS, INC.;
EXCEL COMMUNICATIONS MARKETING, INC.;
and EXCEL TELECOMMUNICATIONS, INC.,

*Defendants.*

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JUDGMENT IN A CIVIL CASE

For reasons stated in the Memorandum Opinion issued on March 27, 1998, defendants motion for summary judgment (D.I. 182) is granted.

IT IS ORDERED AND ADJUDGED that judgment be and is hereby entered in favor of defendants EXCEL COMMUNICATIONS, INC., EXCEL COMMUNICATIONS MARKETING INC. and EXCEL TELECOMMUNICATIONS, INC.

/s/ Sue L. Robinson
United States District Judge

/s/ Lisa C. Friedkin
(By) Deputy Clerk

Dated: April 1, 1998